III. Case I: The Taiwan Strait Crisis of March 1996

III.1 Introduction

In March 1996 the most serious confrontation in the Taiwan Strait since the 1958 Kinmen crisis occurred. China deployed some 150,000 troops in Fujian Province bordering the strait, and conducted three consecutive military exercises in the areas near Taiwan. These included missile tests close to Keelung and Kaohsiung, Taiwan's two most important seaports; a live-ammunition military exercise, and a large-scale amphibious landing exercise.

Taiwan was on high alert during this period. The United States became involved immediately, sending two aircraft carrier battle groups to the area near Taiwan to monitor Chinese military actions. This was the largest naval movement by the United States in the Asia-Pacific region since the Vietnam War (Porch 1999).

These actions constituted the first potential military confrontation between the two countries since the normalization of relations after President Nixon's visit to China in 1972. Cross-strait tension rose quickly and dramatically and there was widespread fear that China's military exercises might turn into military actions against Taiwan or that accidents might trigger conflict in such a tense situation.

III.2 Timeline

The main events of the crisis are as follows:

August 23, 1995
Lee Teng-hui announces his candidacy for president in the March 1996 election. Beijing's Xinhua (New China) News Agency calls on "all the Chinese people" to sweep Lee "into the dustbin of history."

December 19, 1995
USS Nimitz battle group crosses the Taiwan Straits for the first time since 1979.

January 23, 1996
The New York Times reports China plans to attack Taiwan after the island's presidential elections March 23. China has no comment on the report.

January 24, 1996
Beijing denies the New York Times report that Beijing has completed plans for a limited military attack on Taiwan. A Foreign Ministry spokesman dismisses the report as "totally groundless" and declines to comment further.

February 9, 1996
China begins moving about 150,000 troops to a coastline facing Taiwan. China also reinforces its air strength with 88 warplanes to reach a total number of 226 aircraft deployed at 11 airports along 250 miles of coastline in its southeastern Fujian Province. They also deploy four amphibious landing craft -- two in the Fujian port of Xiamen (3.75

miles from the Taiwan-controlled island of Kinmen) and two at Pingtan (island near Taiwan-controlled Matsu island).

February 12, 1996
Taiwan's Defense Ministry says China is massing up to 150,000 troops for large-scale exercises near Taiwan.

February 23, 1996
Taiwanese presidential candidate Peng Ming-min warns China that if it occupies so much as one inch of Taiwan's territory, he will immediately formally declare Taiwan's independence.

February 28, 1996
The U.S. Export-Import Bank complies with Secretary of State Warren Christopher's request to stop financing any deals in China over the next 30 days while the Administration decides whether it will impose sanctions against Beijing for selling nuclear technology to Pakistan.

March 5, 1996
China's official Xinhua News Agency reports that the People's Liberation Army will stage a series of missile exercises just off Taiwan's coast from March 8 to 15. Xinhua says the training exercises will involve surface-to-surface missiles in two areas: one site northeast of Taiwan, about 21 miles from Keelung port, the other 32 miles west of the southern port of Kaohsiung. By using two sites 250 miles apart, China apparently wants to show it can coordinate a complex, large-scale operation and block Taiwan's ports. Foreign ships and aircraft are advised to stay clear of the test sites. The 40-member House Republican Policy Committee issues a written statement rejecting the Clinton Administration's ambiguity on the question of whether the US would defend Taiwan if it comes under attack from China. The statement says the US should commit itself "to the defense of Taiwan" and work to deter China from "invading, attacking, or blockading Taiwan."

March 8, 1996
At intervals of roughly an hour, three M-9 ballistic missiles carrying dummy warheads splash down into target areas just 22 miles from Keelung, the island's second busiest seaport, and 32 miles from the harbor of Kaohsiung, the third largest container port in the world. These two ports are the closest to the Chinese target zones, and account for 70 percent of Taiwan's two-way trade. China also stages elaborate military maneuvers in a 6,600-square-mile rectangle that stretches to the mid-point of the Taiwan Strait. The area is 30 to 70 miles from Taiwanese Islands. Beijing also says it plans to begin "live ammunition" war games on March 12 in a 6,000-square-mile zone that will obstruct much of the shipping and air traffic in the Taiwan Strait.

March 9, 1996
China's People's Liberation Army announces live-fire naval and air force exercises at the south end of the Taiwan Strait from March 12-20.

March 10, 1996
U.S. Secretary of State Warren Christopher calls China's attempt to intimidate Taiwan "reckless," and announces the dispatch of a battle group led by the USS Independence. He says, "I think they've been risky, and... smack of intimidation and coercion." The

destroyer USS Hewitt and guided-missile frigate USS McClusky will join the Independence north of Taiwan the following day, according to the Seventh Fleet from Yokosuka, Japan. The guided-missile cruiser USS Bunker Hill takes up a position south of the island to monitor China's missile tests, according to the Navy. Secretary Christopher says on NBC's Meet the Press that the U.S. intends the warships to be "in a position to be helpful, if they need to be."

March 11, 1996
1996 President Clinton orders a second US carrier battle group into the area, and the Pentagon shifts a carrier already there closer to Taiwan. The naval battle group led by the USS Independence, stationed about 200 miles off Taiwan's shores the week before to monitor China's ballistic missile exercises, has moved to within about 100 miles. It remains outside the Strait of Taiwan. Secretary of Defense William Perry says the movement of U.S. warships is "a prudent, cautionary measure."

March 12, 1996
China launches war games southwest of Taiwan, drawing a Taiwanese threat to strike back if the mock warfare turns into an attack. Chinese combat planes and warships practice bombing runs and drills off Taiwan at the start of eight days of war games. About 10 Chinese ships conduct formation drills, and about 10 warplanes practice air cover, surveillance and bombing runs near Dongshan and Nan Ao, on China's southeastern coast. Taiwan places its 400,000-member military on heightened alert, especially on the islands that face the exercise area.

March 13, 1996
China fires another missile near Taiwan, but unlike the others, this one does not cross Taiwan's territorial waters. The missile was an M-9 intermediate-range missile.

March 14, 1996
A key House panel Thursday approves a non-binding resolution urging the United States to intervene militarily if Taiwan is attacked, invaded, or blockaded by mainland China. In a voice vote, the House International Relations Committee passes the measure, which says the United States "should assist in defending (Taiwan) against invasion, missile attack, or blockade by the People's Republic of China."

March 18, 1996
The PRC launches a joint force maneuver into the sea near Pingtan, Fujian Province.

March 19, 1996
The PRC stages a landing exercise on a small islet.

March 19, 1996
The Clinton Administration approves Taiwan's request to buy Stinger air defense missiles and other weapons, a move officials say reflects a longstanding US commitment to help Taiwan defend itself. In addition to the Stingers, weapons of last resort against close-in air attack, Taiwanese authorities have permission to buy an advanced targeting and navigation system for fighter jets and electronic warfare devices. However, Taiwan's request for submarines is turned down.

March 21, 1996
Taiwan's Defense Minister Chiang Chung-ling confirms reports that Taiwan will hold military exercises in its front-line Matsu Islands in early April, on the heels of China's war games in the Taiwan Strait.

March 22, 1996
USS Nimitz battle group arrives to the vicinity of Taiwan.

March 23, 1996
Taiwan holds its first-ever democratic elections for president as well as elections for members of the National Assembly.

March 26, 1996
China announced last night that its war games are over, temporarily halting moves to intimidate Taiwan, which completed an historic presidential election at the weekend. The United States announces that it will withdraw the US aircraft carriers currently operating in the area..

April 2, 1996
Taiwan postpones military exercises set for April 7-10 near China. Taiwan's Defense Ministry, responding to US and domestic concerns, says the war games will be rescheduled for a June 30 start "to avoid any misunderstanding and to ease tensions" in the region.

III.3 Impact on Oil Markets

Figures 3-6 below depict the impact of crisis events on the NYMEX oil market (figures for related markets are presented in Appendix A). Figures 3 and 4 summarize the major movements in the NYMEX spot price during this period. Of particular note is the gradual upward trend during most of this period culminating in several sharp jumps – March 18, 19, and March 20, followed by a sharp drop on the 21st. Toward the end of March, the upward trend upward resumed peaking in mid- April.

The April price increases do not appear to be related to the Taiwan Strait crisis or its aftermath. According to accounts at the time appearing in the Financial Times, low stock levels and high demand because of cold weather hit the oil markets. Crude oil prices hit a five-year high in early April 1996, but later in the month began to drift down as consumption leveled off in the warmer season.

Figure 5, tracing the difference between the spot and first forward rate and the difference between the first and second forward rates in the NYMEX market, depicts how the markets perceived risk during this period. The spot is the daily NYMEX crude oil rate, while the forward markets refer to contracts for crude oil twenty or so months into the future. A standard measure of risk as perceived by the markets is the premium of the spot price over the price of the first forward contract, or first over second forward. In particular the premium for earlier over later delivery was apparent with the sharp increase in the speeds between the spot and first forward rate, especially on March 20. The spread between the first and second forward started widening dramatically March 14, reaching a maximum on March 19. Both measures fall dramatically after the arrival of the Nimitz battle group.

The downward sloping forward profiles (Figure 6) in the NYMEX market suggest that throughout March 1996 there was widespread concern over the availability of secure oil deliveries. Traders during this period were willing to pay a considerable premium for earlier rather than later delivery. The forward profiles peak at the height of the Taiwan crisis on March 19 and 20. After the arrival of the Nimitz battle group on March 22, however the profiles begin to drop.

Figure 3

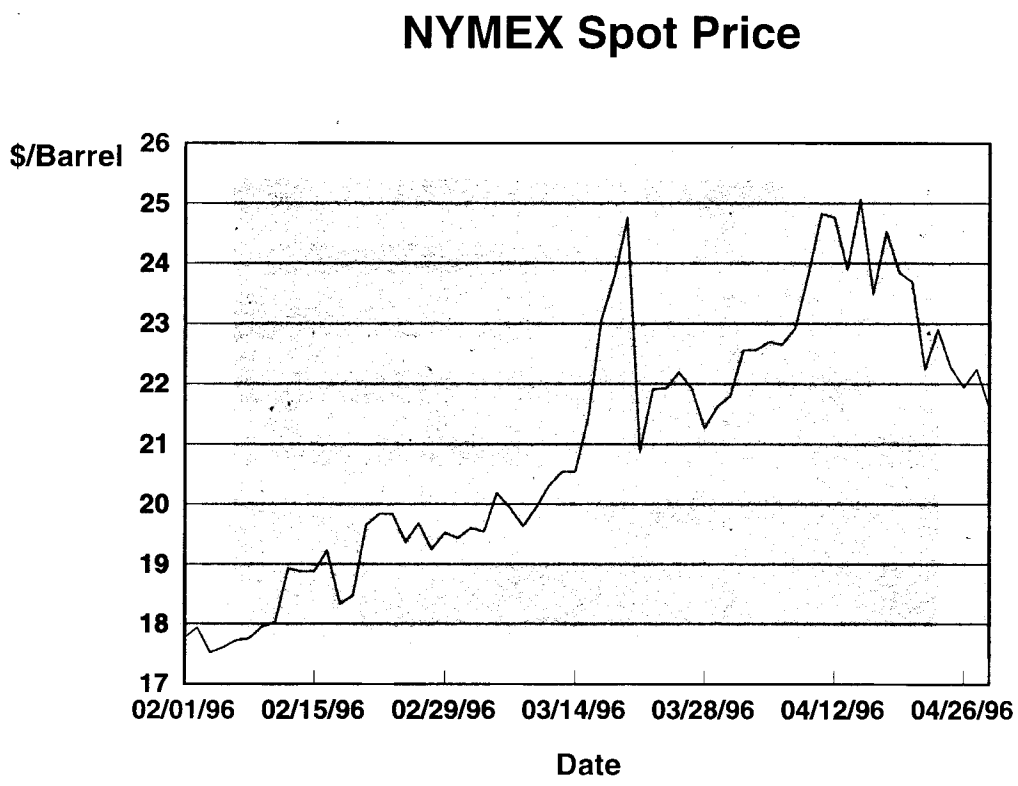


Figure 4

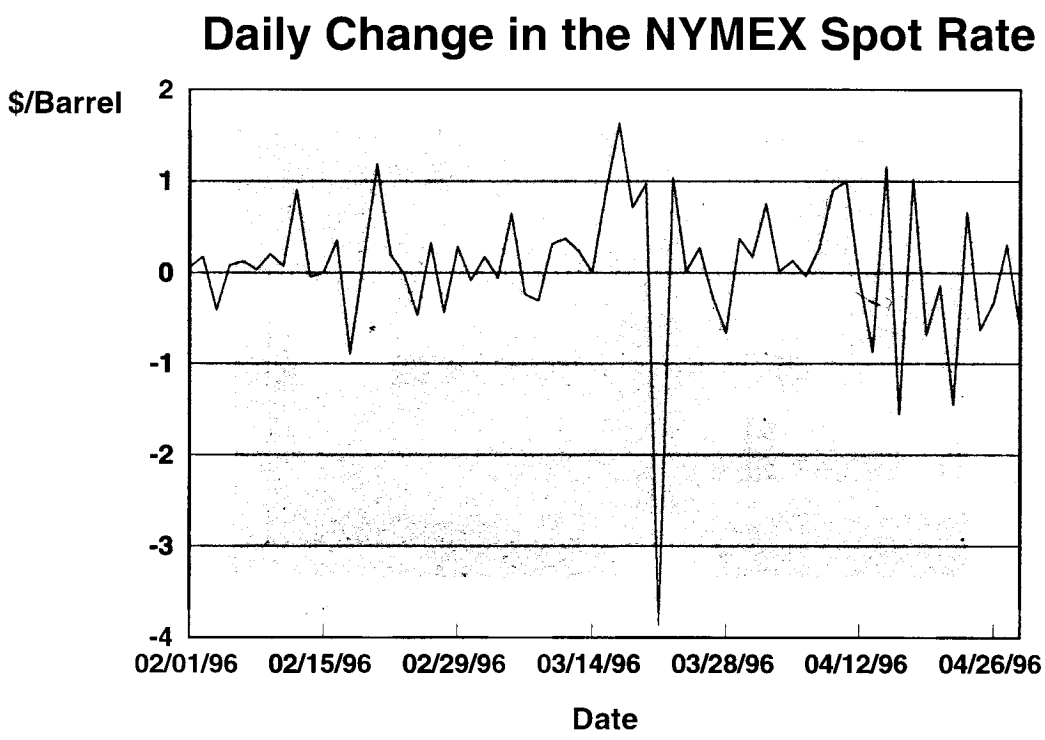

Daily Change in the NYMEX Spot Rate
$/Barrel
2
1
0
-1
-2
-3
-4
02/01/96
02/15/96
02/29/96
03/14/96
03/28/96
04/12/96
04/26/96
Date

Figure 5

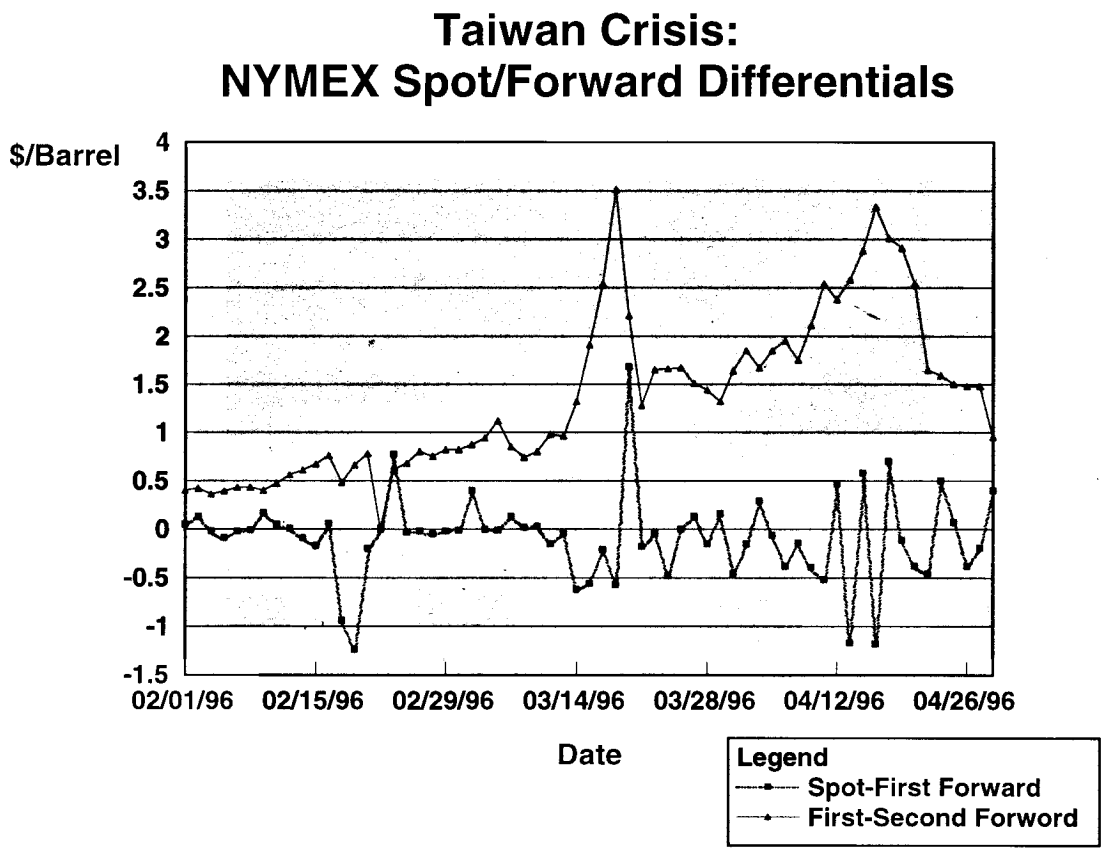
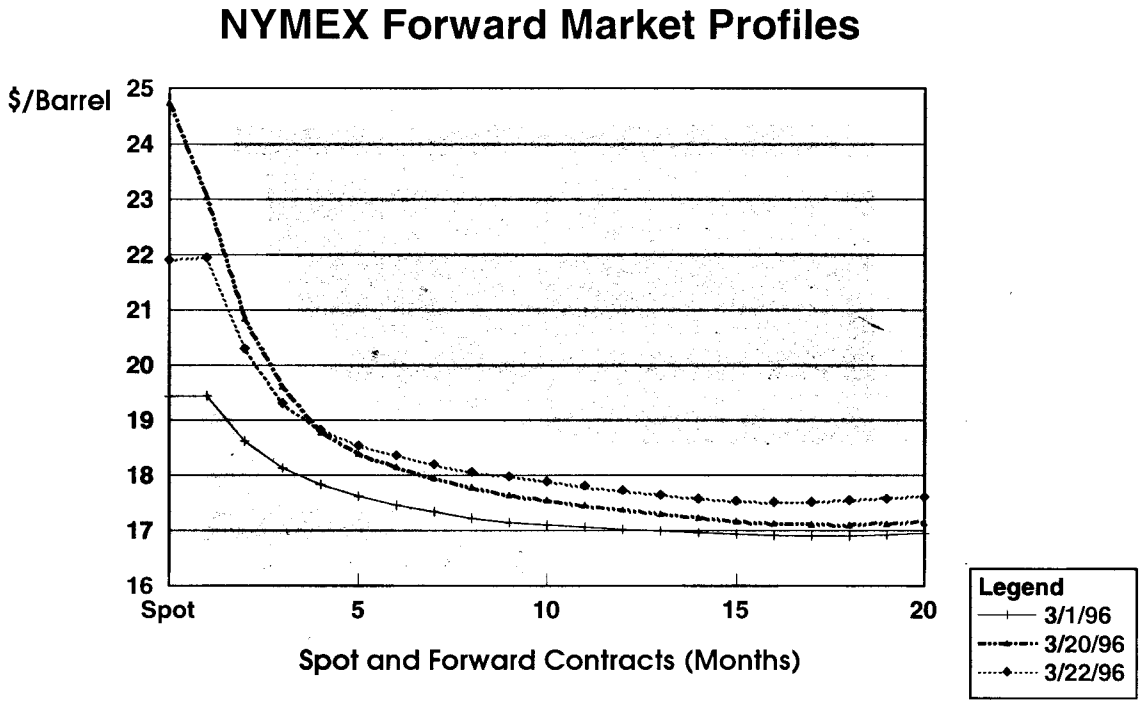

Taiwan Crisis:
NYMEX Spot/Forward Differentials
$/Barrel
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
02/01/96
02/15/96
02/29/96
03/14/96
03/28/96
04/12/96
04/26/96
Date
Legend
Spot-First Forward
First-Second Forword

Figure 6



III.4 Event Analysis

The Taiwan Strait case offers a good opportunity to apply the event analysis discussed in the methodology section to the actions associated with the crisis timeline. If in fact the markets are concerned with an impending conflict that may be potentially disruptive to trade, there should be movement in price(s) in response to events that are perceived to either heighten or lessen the likelihood of shortages, delays and the like.

As noted in the methodology section, the key element in constructing an event analysis is the assignment of values for each key occurrence or development. Starting with the timeline, the following values were assigned on the basis of their perceived affect on oil markets. High values such +3 suggest that the markets interpret the event as one having potentially severe repercussions for continued production and availability of oil. On the other hand, a score of –3 suggests that market interpret this event as one likely to improve the environment for increased production and availability. As noted above, the key issue in the Taiwan Strait case is the manner in which the markets interpreted the movement of US naval forces.

The scoring in EVENT3 assumes a favorable response to naval action. A value of –2 is assigned to the December 19 action when the USS Nimitz battle group transited the Taiwan

Straits for the first time since 1979. A value of –3 is assigned to the March 22, 1996 action when the USS Nimitz battle group again arrived in the vicinity of Taiwan. The –2 and –3 scores are subjective and are assigned after a careful reading of the accounts of the time that suggest the March date provided a more decisive statement of US resolve. As a practical matter, the main findings of the case would not change if both events were scored with a –2 or a –3.

To test alternative interpretations of the manner in which key markets interpreted the significance of naval actions during this period, several other event scoring schemes were devised. In the first, EVENT3A, the December 19 event receives a +2 with the March 22 event maintaining its –3 value. In EVENT3B both naval events receive positive values and in EVENT3C all events, naval and non naval, receive a positive score. In short we have different interpretations of the manner in which markets may have assessed naval actions. These move from EVENT3 where the markets are relieved at US intervention to EVENT3B where the markets are concerned that US naval actions may lead to conflict and possible supply interruptions. EVENT3C assumes EVENT3B effects and, in addition, that all other non-naval events also destabilize the situation.

Summing up, based on this scheme, we would expect that if naval forces do in fact diffuse tension and restore market stability EVENT3 would have the strongest statistical associations with oil prices, this association would lessen with EVENT3A and be non-existent with EVENT3B and EVENT3C. The complete set of events and scores appear in Appendix B. The actual statistical output from the event analysis for this and other cases can be obtained from the authors upon request. The same applies to the national income models used to compute the economic impacts of crisis response by forward deployed naval forces.

The following sections apply the methodology outlined above. One advantage of this approach is that the same basic technique can be applied across a spectrum of different markets. After the oil markets, NYMEX, the analysis focuses on several of the regional share markets, the Hang Seng (Hong Kong) and the Nikkei (Tokyo). Following the logic outlined above for the oil markets, if naval events allay fears and concerns of escalating conflict we should expect these markets to increase in value following crisis response. Finally, event analysis is applied to the yen/dollar exchange rate. Again, we would anticipate an appreciation of the dollar if markets view naval crisis response as preventing the escalation of a regional conflict.

III.4.1 NYMEX Crude Oil Market

The first statistical examination of the impact of events on the NYMEX market involved assessing the determinants of the spread between the first and second forward contract. This spread is a standard measure of the market's assessment of risk. The greater the premium for immediate delivery, the greater fear traders have that the crisis will result in supply interruptions and delays—they are willing to pay a premium for immediate delivery rather than taking their chances on delivery at a later time.

Correcting for serial correlation and introducing the event variables produced a striking result. For all cases (separately using EVENT3, EVENT3A, etc.), increased daily volatility (as proxied by the difference between the close and opening of the day), presumably reflecting uncertainty, increases the spread between the first and second forward contract. When all of the event variables have a positive sign (EVENT3C) the event variable does not affect this spread (the variable is not statistically significant). However, as more and more individual events take on negative signs the statistical significance of the event term increases, culminating in EVENT3

where all US Navy developments have a negative sign. Here the event term reduces the premium on earlier delivery, suggesting that naval crisis response reassures the markets that supplies will not be disrupted.

Next, an analysis was undertaken of the short and longer-run impact of naval actions on oil prices (Figure 7). (The statistical results from the ARDL/error correction analysis that form the basis of the discussion below are available from Dr. Looney.) Here a similar pattern occurred. Starting with EVENT3C (all events cause oil price increases), there was no statistical relationship between the major crisis developments and oil price increases. However as the naval events were assigned negative signs (i.e., depicting the hypothesis that naval action reduces oil prices), the event term became both stronger in terms of the size of its coefficient and in statistical significance. Thus naval actions during this period contributed to lower oil prices than would have prevailed if naval activity had been absent.

The analysis also confirms that naval actions contribute to the long-term adjustment of the oil markets following various event shocks. As noted in the example in the methodology section, the error correction mechanism, or ecm term, controls this adjustment over time. The term itself reflects the NYMEX's deviation from the long-run historical pattern it has established with the Brent markets. The ecm term has a negative sign in the NYMEX price equation and is proportional to the difference between the NYMEX and Brent prices. For example, higher Brent prices would, everything else equal, reduce the size of the ecm term, thus reducing that term's negative impact on oil prices over time. EVENT3 is also in the ecm term suggesting that stabilizing naval actions control the movement of the NYMEX market price over time.

The negative sign on the EVENT3 term in the ARDL's ecm term is consistent with this interpretation. More negatively signed naval events, again everything else equal, would reduce the value of the EVENT3 term, thus increasing the size of the ecm term. Given the ecm term's negative impact on oil prices, the consequences of naval activity would be a slowing down over time in NYMEX price increases following other shocks.

It follows that increases in non-naval events (for the most part positively signed) would tend, as with increases in the Brent prices, to reduce the size of the ecm term, thus reducing price retarding pressures on the NYMEX markets. Finally these interpretations are consistent with the finding of a lack of statistical significance of event terms scored on the hypothesis that naval activity results in higher oil prices.

III.4.2 The Hang Seng Share Markets

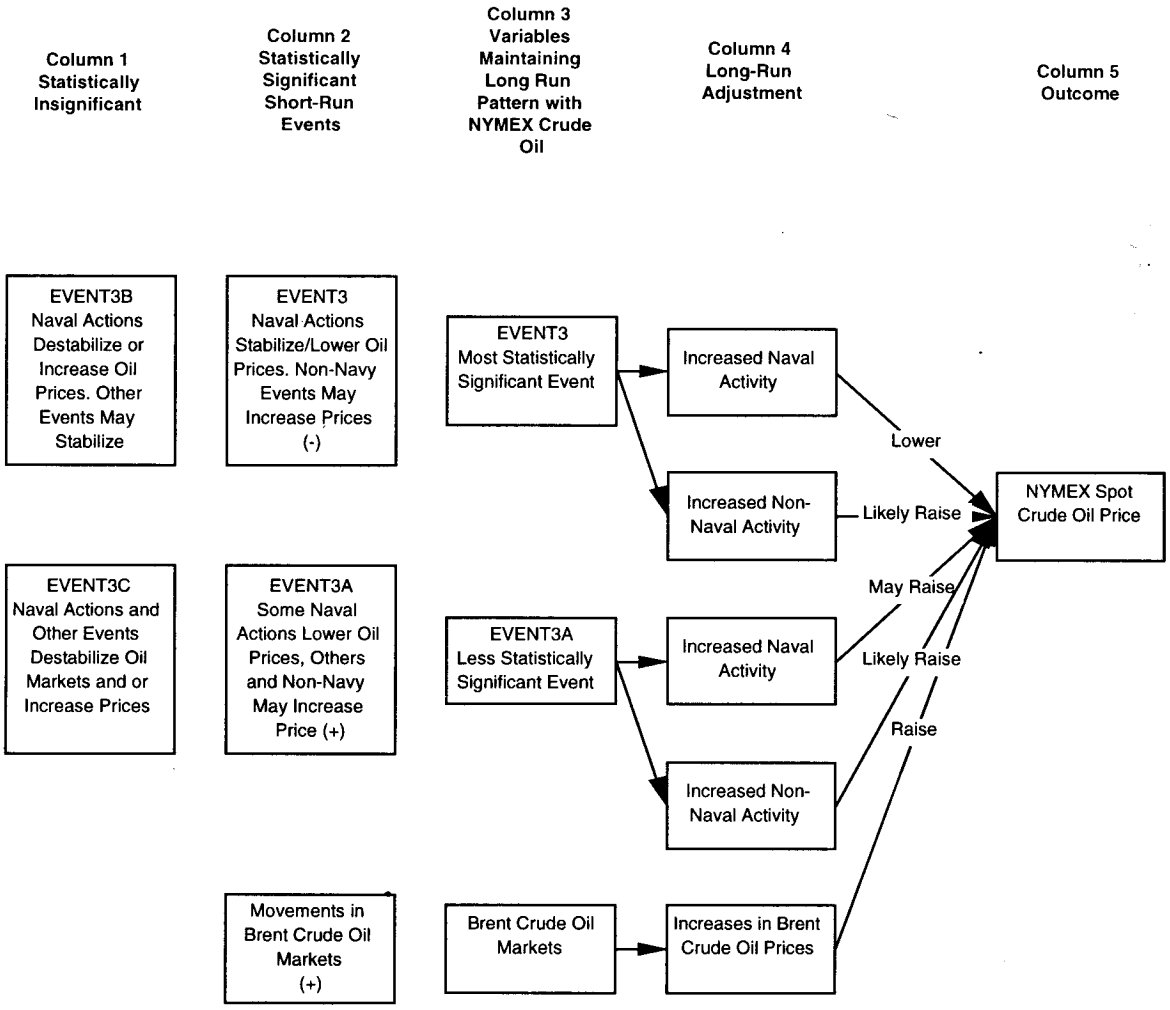
Several observers have noted the apparent linkage between some of the Taiwan crisis events and simultaneous movements in the Hang Seng (Hong Kong) share index. However, just because that index goes up or down on one day or another would hardly seem to be of major significance for the United States economy, or any other major economy for that matter. On the other hand, if events such as naval actions affect the longer run adjustment of that market, there would no doubt be a number of important consequences for other markets and perhaps even major economies.

Following the methods used above to assess the movements in the NYMEX oil markets, the event terms were introduced to determine any possible short- and long-run associations with the Hang Seng Index. Here EVENT3, EVENT3A and so on retained their signs from the NYMEX analysis on the assumption that favorable events in the NYMEX markets (in the sense of lower oil prices) would have a predictable corresponding impact on the Hang Sing share

market (higher values). If we assume the same trader physiology across a wide variety of markets, naval events that lowered the price of oil should simultaneously raise share prices. It follows that the event variables should have the reverse signs in the Hang Seng equations from those found in the NYMEX market analysis.

Figure 7

Taiwan Strait Crisis:
Event Analysis of Developments and their Impact on the NYMEX Oil Markets



Note: Column 1 depicts the event measures (EVENT3B and EVENT3C) that were not statistically significant in affecting the NYMEX oil markets. The second column identifies those event variables (EVENT3 and EVENT3A) that formed a statistically significant relationship with the NYMEX markets. Drawing on Column 2, Column 3 depicts the variables (EVENT3, EVENT3A and the Brent markets that establish a long-run relationship with the NYMEX. Based on the signs of the regression coefficients, Column 4 summarizes the probable net impact (short- and longer-run effects) of naval and non-naval events on the NYMEX.

The main findings (Figure 8) show a pattern similar to the NYMEX analysis. Events EVENT3B and EVENT3C that incorporated positive signs for naval actions were not statistically significant. In other words the assumption that naval events accelerate uncertainty and instability lacks empirical verification. On the other hand the two events that assume a stabilizing role for naval actions (EVENT3 and EVENT3A) were statistically significant, with the significance increasing with all naval events possessing a negative sign (EVENT3).

In the short-run EVENT3 (naval events stabilizing) has a negative sign in the Hang Seng index equation. Clearly increased naval activities lowering the size of this term would tend to impact favorably on that market's overall valuation. The Hang Seng also moves in response to movements in the FTSE-100 and the New York Stock Exchange's Composite index.

In the longer term the ecm or adjustment term has, as in the NYMEX market, a negative sign. This suggests restraints on the longer run movements in the Hang Seng. For example, everything else equal, increases in the NYSE or the FTSE-100 tend to retard declines in the Hang Seng. In contrast to the NYMEX, the EVENT3 term has a negative sign in the ecm term. This suggests that positively signed (non-naval) events associated with the crisis increase the size of the ecm term, thus placing greater pressure on the Hang Seng to move downward over time. On the other hand the negatively signed naval events reduce the size of the ecm term, thus everything else equal, causing generally higher share prices over time.

III.4.3 The Nikkei Share Markets

The other major regional share market is the Nikkei (Tokyo). While this market was somewhat more removed from the conflict site, the Japanese economy itself is very dependent on access to energy and other critical imports. It is likely therefore that concerns over Taiwan would get translated into the Nikkei markets.

In most respects, the ARDL analysis of the Nikkei produced results (Figure 9) very similar to those obtained from the Hang Seng:

- The event variables incorporating the navy's stabilizing role are statistically significant. In contrast, those formulations based on the assumption that naval events produce increased uncertainty and instability were not statistically significant.

- The significance of the event variables increase as the navy's assumed stabilizing role increases.

- Naval activities produce not only a stabilizing short-run effect, but more importantly contribute to long-run movements in the Nikkei index. That is, naval events would be expected to increase the over-all value of the Nikkei over time.

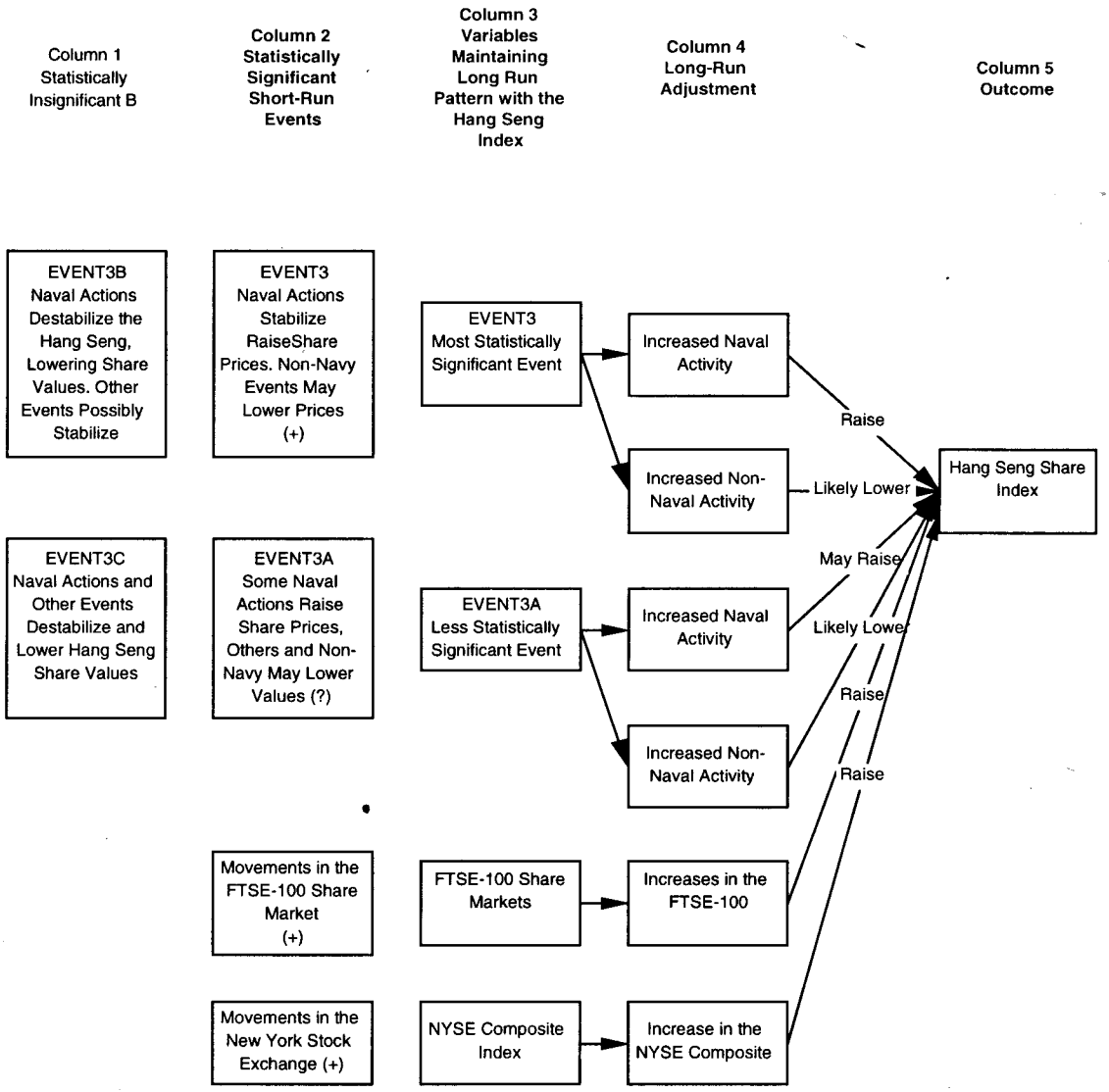
- Conversely, non-naval crisis related events would most likely reduce share values over time.

- One difference between the Hang Seng and Nikkei indexes is the role of other share markets. The Hang Seng reflects movements in both the FTSE and the New York Stock Exchange Composite index.

- The Nikkei on the other hand does not appear (at least in the period under construction) to be affected by movements in these markets. Instead the Nikkei appears mainly influenced by movements in the dollar/yen exchange rate, with devaluations in the dollar/yen rate depressing share values.

Figure 8

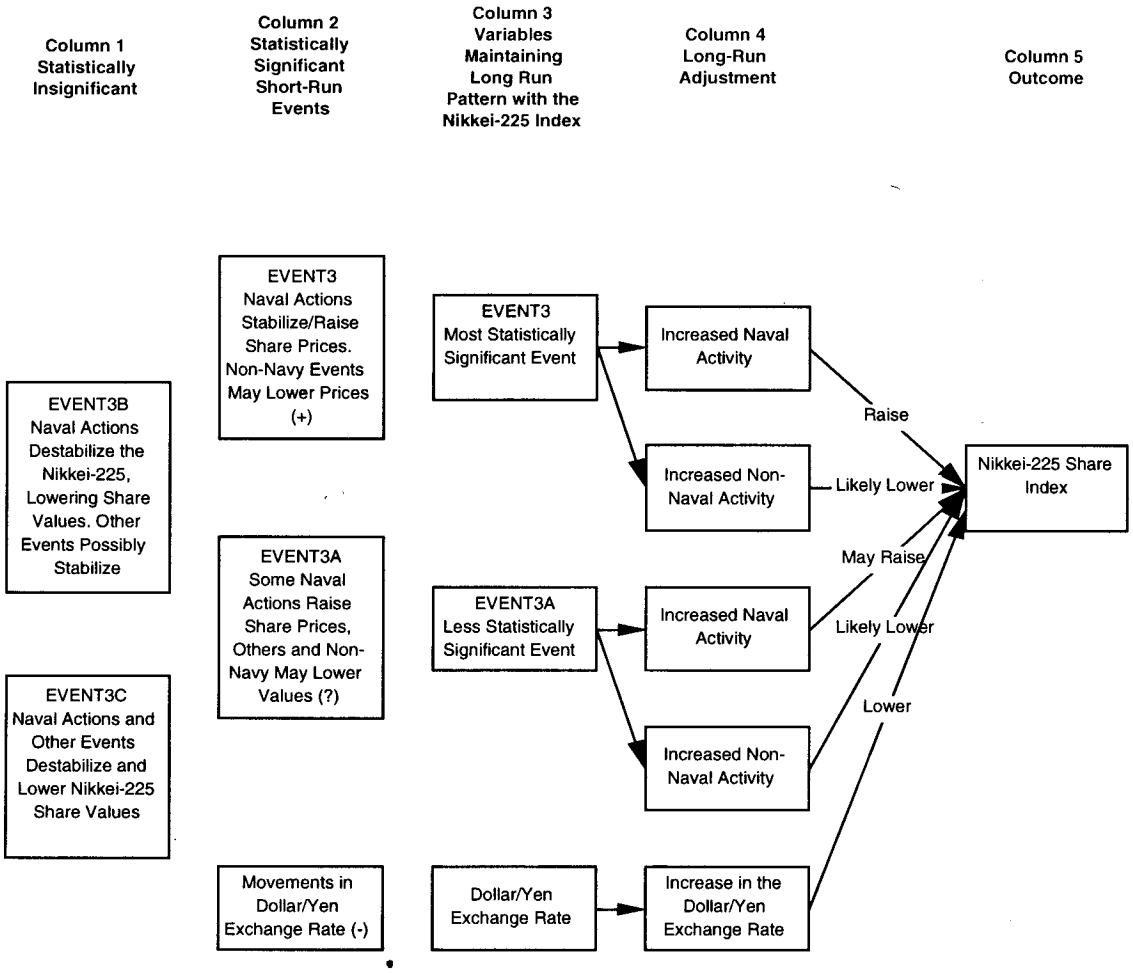
Taiwan Strait Crisis: Event Analysis of Developments and their Impact on the Hang Seng (Hong Kong) Share Market



Note: Based on results from the ARDL/error correction analysis. See Figure 7 for a description of the main linkages and their interpretation.

Figure 9

Taiwan Strait Crisis:
Event Analysis of Developments and their Impact on the NIKKEI-225 (Tokyo) Index



Note: Based on results from the ARDL/error correction analysis. See Figure 7 for a description of the main linkages and their interpretation.

III.4.4 The Dollar/Yen Exchange Rate

The dollar/yen exchange rate is of critical importance for both the United States and Japanese economies. If this exchange rate gets too far out of alignment, both countries can feel increased economic strains leading to frictions and conflicts in other areas. While it is controversial as to what the "correct" exchange rate between these two leading currencies is at any particular point in time, it is of interest to assess the manner that crisis affect that rate over time. Do confrontations such as the one in the Taiwan Strait strengthen or weaken the dollar with regard to the yen? Do naval events have a longer run carry over effect on the value at which these currencies trade? Again, the ARDL analysis identified (Figure 10) a series of key linkages between naval activity and the strength of the dollar.

The main findings of the dollar/yen event analysis are as follows:

- In contrast to the other markets examined, only the event variable (EVENT3) with all naval events having a negative signs was statistically significant.

- The short-run sign on EVENT3 is negative suggesting that increased naval activity (because of its negative sign) tends to cause an appreciation of the dollar (relative to the yen).

- Similarly, non-naval events because of their less predictable consequences tend to weaken the dollar.

- As noted above, the Nikkei is linked to the dollar/yen rate with increased value in the Nikkei causing a decline in the dollar (no doubt though investors shifting out of dollar assets to purchase an increased number of yen denominated shares).

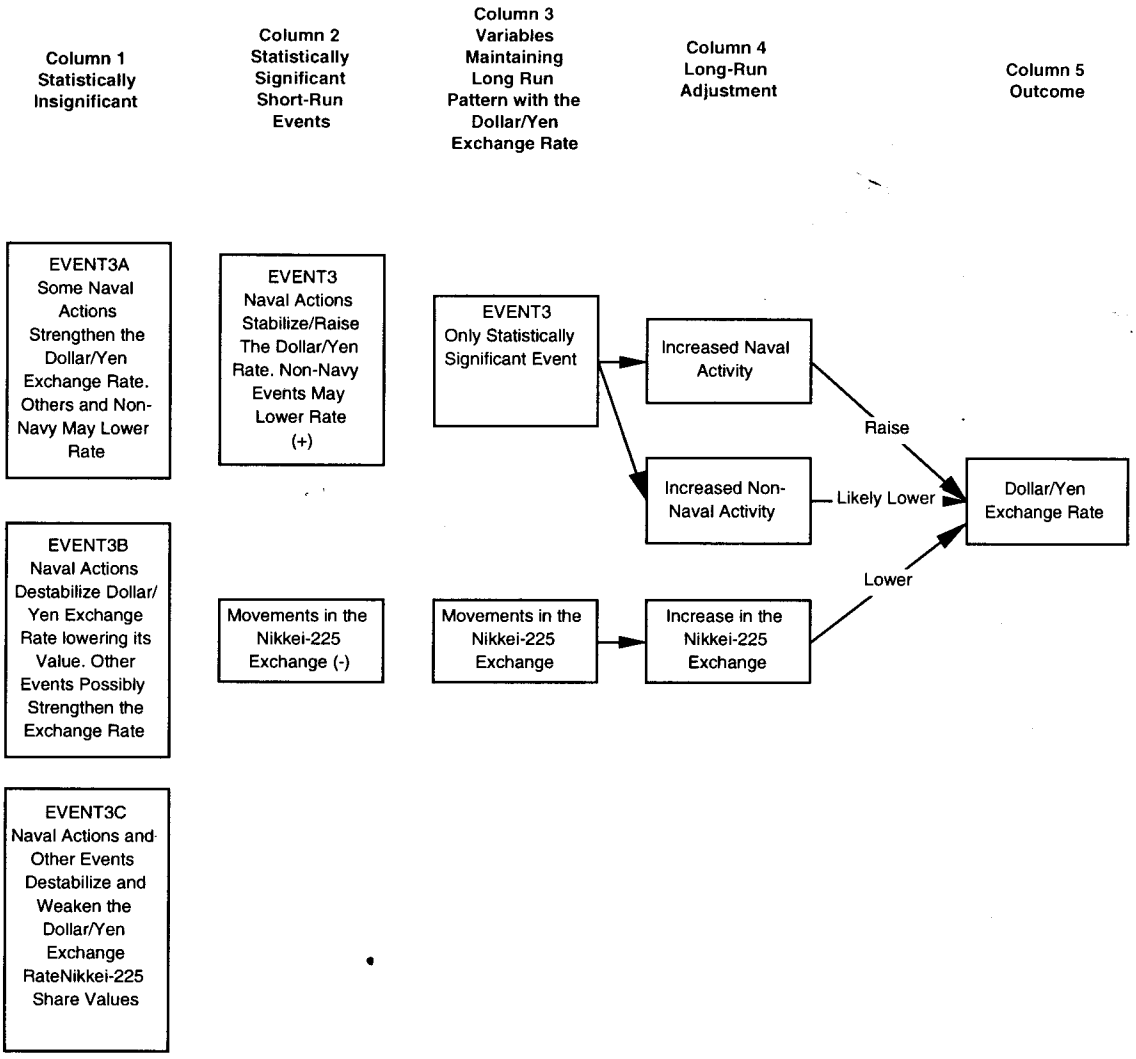
- As with the other markets examined here, the event term contributes to the long-term adjustment in exchange rate markets. Given its negative value, the ecm term in the yen dollar equation tends to retard the appreciation of the dollar. For example the Nikkei has a positive sign in the ecm equation. Increased value in the Nikkei thus increases the ecm term, placing a drag on potential dollar appreciation.

- Similarly, the EVENT3 term has a positive sign in the ecm equation. Here, positively signed non-naval events would create increased uncertainty over conditions in the region. In turn this would be reflected in a larger ecm term and, given that term's negative sign in the dollar/yen equation, a suppressing effect on any potential dollar appreciation.

- Conversely, negative signed naval events would tend to reduce the size of the ecm term, thus providing, everything else equal, greater dollar appreciation over time.

Figure 10

Taiwan Strait Crisis:
Event Analysis of Developments and their Impact on the Dollar/Yen Exchange Rate



Note: Based on results from the ARDL/error correction analysis. See Figure 7 for a description of the main linkages and their interpretation.

III.4.5 Summary

Several results are of note. The four dominant markets in the region, NYMEX, the Hang Seng share market, the yen, and the Nikkei share market were all affected by the crisis with naval forward presence providing the impact one would expect if in fact the naval forces provided a stabilizing role—lower oil prices, higher share prices, dollar and the like.

Other markets, the Brent oil market, the CRB commodity markets, the Mark, the FTSE, the NYSE, the Dollar Index were not directly affected (at least not in the statistical sense used here). This suggests that the findings for the East Asian markets were not the result of a spurious correlation with some unspecified worldwide phenomenon.

On the other hand, since several of these markets were cointegrated with the East-Asian markets, it is likely there was a carry-over effect to other parts of the globe. Specifically, the Brent markets for example are highly cointegrated with the NYMEX. It follows that adjustments in the NYMEX subsequent to an event would ultimately alter the Brent Crude price of oil.

Most importantly the event analysis confirms the assumptions made below in the calculation of economic benefits associated with naval crisis response. The dates chosen were correct and the assumptions concerning the appropriate lags were also confirmed by the event analysis.

III.5 Economic Benefits

The event analysis suggests that two key naval events occurring on December 19, 1995, and March 22, 1996 tended to reduce pressure on the NYMEX oil markets. The key dates for the calculations of economic benefits associated with naval forward presence/crisis response are:

March 1, 1996
A benchmark before the crisis unfolds. This was a period of relative stability in the oil markets before a series of announcements and press speculations set off increases in the price of oil.

March 20, 1996
Based on the movements of the spot and forward profiles, this date appears to be the peak of the crisis, or at least the period of greatest uncertainty precipitated by a series of hostile PRC statements and actions

March 22, 1996
USS Nimitz Battle Groups arrive in the vicinity of Taiwan, which as the event analysis suggests was a key element in stabilizing the oil/share and exchange rate market.

The NYMEX forward profiles (Figure 6, page 21) depict development in the oil markets on these key dates.

III.5.1 Assumptions

As the event analysis suggests, naval actions during this period had a number of significant impacts on key markets: the NYMEX crude oil market, the Hang Seng and Nikkei share markets and the Dollar/Yen exchange rate. Translating these impacts into tangible economic benefits to the United States economy, however, is complicated by several conceptual problems.

First, the great time difference between Taiwan and New York makes the selection of dates for the calculation a bit fuzzy. Although the Nimitz arrived in the vicinity of Taiwan on March 22 (local time), this was still March 21 in New York, and hence some of the effect of this naval action was no doubt registered in the NYMEX on the 21st. On the other hand the event analysis suggests that the optimal lag for the naval event impact was one day, which suggests that March 22 is probably the more reliable date for the calculation of benefits.

Second, just what crisis and run up in oil prices did the Nimitz affect? Should the differential between March 1 and March 22 be the interval for the Nimitz's impact? This calculation would suggest that the Nimitz effect's benefits be calculated in terms of some earlier equilibration in the oil markets before the initiation of Chinese actions and announcements. Unfortunately setting a date, say, before March 5 (key Chinese announcement) is somewhat arbitrary. As noted, March 1 makes sense, but there are other candidates as well. Alternatively, is it the difference between the height of the crisis on March 20 and March 22? The latter would seem to provide a more tangible situation to examine.

III.5.2 Findings

Following the methodology outlined earlier in the report, the economic impact on the US economy is calculated on the basis of the different prices that were reflected by the forward markets on the key dates noted above. In turn, these prices shock key variables in the US economy—mainly several types of investment. Shifts in investment as well as energy and exchange rates in turn ripple through the economy to change Gross Domestic Product from what it would be under a different set of oil/exchange rates. In short, what would the US economy have looked like if the prices existing in forward markets on March 20 and March 22 actually come to pass? The differences in GDP under each scenario represent the economic impact associated with naval forward presence/crisis response.

As a basis of comparison, three calculations derived from the assumed future NYMEX oil price and the dollar/yen exchange rates as they impact on the VAR model of the US economy are presented (Table 2):

- A total crisis impact—based on the different economic environments associated with (March 1 – March 20 interval)
- Crisis Response A – reflecting date/time vagueness -- based on the different economic environments associated with (March 20-March 21 interval)
- Crisis Response B – the best estimate for reasons noted above – based on the different economic environments associated with (March 20-March 22 interval).

Summing up:

- The most likely sum of economic benefits derived by the United States from Naval Forward Presence during this period is approximately $3.4 billion (1995) dollars (Crisis Response B).
- A slightly less plausible estimate is $6.4 billion (Crisis Response A).

- However, if one argues that the true benefits associated with naval forward presence and crisis response should be measured in terms of a counterfactual decline in GDP that might have occurred if no naval response whatsoever was made, then a high, but still credible estimate, would lie between Crisis Response A and the Crisis Response Impact totaling 14.9 billion [6.4 - (-8.5)] and Crisis Response B and the Crisis Response Impact or 11.9 billion [3.4 - (-8.5)].

III.6 Conclusions

The findings for the Taiwan Strait Crisis came at somewhat of a surprise. Most analysts had assumed that because oil was not directly involved, the economic benefits associated with this naval crisis response were nill. While several markets including the Hang Seng were examined (System Planning Corporation 1996), the general feeling was that the movements in these regional markets were more overnight effects, perhaps more influenced by movements in US interest rates than crisis events. The conventional wisdom was that their movements were unlikely to be of much significance for the United States economy. For this reason, our initial study did not delve into the case.

In contrast, the analysis above shows that the crisis and associated naval events affected a wide variety of markets including the important NYMEX crude oil price. More importantly, the events of the crisis not only produced the overnight effects but also set off a long-run adjustment process with naval events providing a significant stabilizing role—lowering oil prices and increasing the values of shares and the dollar from ranges they would have assumed in the absence of naval intervention. These market movements and associated forward prices then impacted the United States Economy to produce significant savings in lost GDP of, at a minimum, 3.4 billion 1995 US Dollars.

Table 2

Taiwan Strait Crisis:
Naval Forward Presence Impact on the United States Economy
Oil Price/ Dollar-Yen Effects

(United States GDP in Billions 1995 Dollars)

	Crisis Response Impact	Crisis Response A	Crisis Response B
Quarterly Impact			
1996Q1	0.6	-0.3	-0.2
1996Q2	1.7	-0.6	-0.2
1996Q3	0.7	0.1	0.3
1996Q4	-0.5	0.7	0.6
1997Q1	-1.5	1.2	0.8
1997Q2	-2.4	1.6	0.9
1997Q3	-3.2	1.8	0.7
1997Q4	-3.9	1.9	0.5
Total Impact Through 1997	-8.5	6.4	3.4

Notes: The statistical output of the ARDL/error correction analyses and VAR models on which these results are based are contained in a separate set of appendices available from the authors.

Crisis Response Impact derived by subtracting the United States' GDP estimated on the assumption of March 1 oil and dollar/yen forward prices from that estimated on the basis of March 20 oil, dollar/yen prices.

Crisis Response A = same calculation as Crisis Impact but with (March 21 minus March 20) prices.

Crisis Response B = same calculation as Crisis impact but with (March 22 minus March 20) prices.

VAR Model Construction:
Dependent Variables: GDP (USARGDPS), Private Consumption (USACSMRX), Gross Fixed Capital Formation (USAINVTS), Expenditure on Machinery and Equipment (USAIMCHS), Construction (USAICONS), Government Consumption (USAGOVTX). Exogenous Variables: Oil Prices (NYMEX), Dollar Yen Exchange Rate (YEN) with March 1, 20, 22, 1996 Spot and Associated forward rates: 1996Q2 – 1997Q1. VAR Model Order = 1.